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# UNITED STATES DEPARTMENT OF AGRICULTURE.

Department Circular 115.

Bureau of Plant Industry  
(New and Rare Seed Distribution),

WM. A. TAYLOR, Chief.

## ALFALFA.

Instructions adapted to southern New Jersey, Delaware, southern Maryland, Virginia, Arkansas, Tennessee, and the South Atlantic and Gulf States.

(These instructions are intended primarily for those soils that are not of limestone origin.)

**OBJECT OF THE DISTRIBUTION.**—The distribution of new and rare seeds has for its object the dissemination of new and rare crops, improved strains of staple crops, and high-grade seed of crops new to sections where the data of the department indicate such crops to be of considerable promise. Each package contains a sufficient quantity for a preliminary trial, and where it is at all practicable the recipient is urged to use the seed for the production of stocks for future plantings. It is believed that if this practice is followed consistently it will result in a material improvement in the crops of the country. Please make a full report on the inclosed blank regarding the results you obtain with the seed.

### DESCRIPTION.

Alfalfa (*Medicago sativa*) is a deep-rooted, hardy, perennial forage plant, belonging to the family which includes beans, peas, and clover. It occupies the same place in western agriculture that cowpeas and clover fill in the eastern third of the United States. As a hay crop, alfalfa is to be preferred to red clover in the eastern portion of the country whenever it can be successfully produced. It is equal, if not superior, to the latter in feeding value and yields a greater tonnage per season. Good cowpea hay is almost equal to alfalfa in feeding value, but the number of crops alfalfa produces in one season makes the total yield per acre much greater than that of cowpeas. Alfalfa is also more easily cured. Since it is perennial, it will last a number of years unless crowded out by weeds or otherwise destroyed.

### SOIL REQUIREMENTS.

A deep, fertile, well-drained, nonacid soil, reasonably free from weeds, is required. While the crop has been made to grow on soils

of almost every texture, still its production on deep sands has not generally been a profitable undertaking. It is practically useless to sow alfalfa on thin soils where the bedrock approaches the surface, on land underlain by hardpan, or in locations where the subsoil is so compact that the roots can not penetrate it to considerable depths. It is also equally useless to attempt to grow alfalfa on land where the water table comes near the surface. In porous soils that conduct water readily, standing water at 4 or 5 feet may be injurious. In the closer textured soils, however, the water table may with safety be at somewhat shallower depths, but even then it would be inadvisable to attempt the cultivation of this crop with standing water nearer than 3 feet below the surface. For the purpose of ascertaining the character of the soil and subsoil and also the depth of the water table, frequent borings should be made with a soil auger. In determining the adaptability of a tract of land to alfalfa, this auger will generally be of greater assistance than a chemical analysis of the soil.

Not only should the land have good underdrainage, but the surface should have sufficient slope to carry off the surplus water readily. Rich river or creek bottom lands which are subject to overflow are well suited to the crop, provided these overflows are not of long duration and the land is well drained.

#### PRECEDING CROP.

When once started under favorable soil conditions, weeds will likely prove the most dangerous enemy. For this reason it is best to precede alfalfa for one or two years with crops which are either clean cultivated or which themselves choke out the weeds, as, for instance, cowpeas. As a general thing, seedings on sod lands have not been successful and are not recommended. Early truck and potato crops furnish excellent opportunities for destroying weeds and may generally be taken off the land in time to give ample opportunity to prepare it for fall seeding. The crop can also follow oats and wheat to good advantage, provided the land has previously been treated in such manner as to destroy most of the weeds. Excellent results are also secured on summer fallow, but this system is often objected to on the ground that it results in the loss of the use of the land for a large part of the season.

#### PREPARATION OF LAND.

Many of the failures to secure a good stand of alfalfa may be traced directly to the improper condition of the seed bed. The soil should be fine and loose for the upper 2 or 3 inches, and below that it should be sufficiently firm to favor capillary action, yet porous enough to insure good drainage and aeration. If possible, at least six weeks

should intervene between the time of plowing and that of seeding. Frequent harrowing should be given to settle the ground, produce the necessary fine tilth, and destroy the weed seedlings as they start. Moreover, the land should contain a fair supply of humus. This can be supplied by applications of well-rotted, weed-free stable manure. Where this is not available, it is desirable to plow under some green-manure crop, such as red, crimson, or bur clover, cowpeas, soy beans, or rye and vetch, the kind of crop depending on the locality. Cowpeas can not well be plowed under in time for planting alfalfa in the same season, as the vines do not have an opportunity to decay before time for planting. They can be plowed under the autumn previous and the land sown to crimson clover or rye and vetch that fall or to cowpeas the following spring. If sown again to cowpeas, they should be sown early, mowed, and the stubble disked and repeatedly harrowed to bring the land into the necessary well settled and finely pulverized condition for alfalfa. Red or crimson clover or rye and vetch can be plowed under and the ground harrowed frequently until late summer or early fall, when the seeding should take place. Where alfalfa is to follow wheat or oats the land should be double disked just as soon as these crops are removed and harrowed every week or 10 days until time for seeding. If it is to follow potatoes or some other truck crop and the field is clean, rich, and mellow, the potato vines or other refuse should be raked off, the land disked, and then put into fine tilth with a spike-tooth harrow. In sections where considerable silage corn is produced, successful stands of alfalfa are sometimes obtained by seeding after the corn is removed, the land being treated in practically the same manner as where the crop follows early potatoes.

#### LIMING.

Practically all the soils in the region under consideration are benefited by applications of lime. It may be applied with a manure spreader, a fertilizer distributor, a lime distributor, or by hand. Any method which spreads the lime uniformly and at low cost is satisfactory. It should be applied at least two or three weeks before seeding, in order that it may become thoroughly incorporated with the soil. At least a ton of burned lime is generally required, and larger applications are often necessary on the heavier soils. If ground limestone or ground oyster shell is to be used, the quantity should be double that of the burned lime. Experiments have shown very little difference in the final results obtained from the different forms of lime. Burned lime will give quicker results, but the ground limestone and ground oyster shell will finally give the same benefit. The essential element in lime of any form is the calcium oxid, and



it is recommended that the farmer use whichever form of lime is cheapest, based upon the percentage of this element present. Where the consumer pays the freight, it should be remembered that he will not only have to pay such charges on practically twice as much of the ground limestone as of the burned lime, but will also be to the additional expense of hauling and spreading 2 tons of the former to 1 of the latter in order to obtain the same results.

#### FERTILIZING.

Well-rotted barnyard manure which is comparatively free from weeds is the most satisfactory fertilizer. It should be spread on the land before plowing, in order that it may become thoroughly incorporated with the soil. Good results also follow from heavy applications to the preceding crop. If the manure is not available, a liberal application of commercial fertilizers, rich in phosphoric acid, should be made. The percentage of nitrogen may be low, but some nitrogen should be supplied for the young plants before they become inoculated and are able to secure their supply from the air. On most clay soils heavy applications of potash have not been profitable. A combination which has been commonly recommended is muriate of potash, 75 to 100 pounds; acid phosphate, 350 to 500 pounds; and nitrate of soda, 50 to 75 pounds. The cheapest and most satisfactory method by which the consumer may obtain such a combination is to purchase the desired ingredients and mix them in their proper proportions.

#### INOCULATION.

Nitrogen-fixing bacteria should be provided unless the soil is known to be naturally supplied with these germs. This may be best accomplished by scattering over the area to be seeded soil from a field upon which the crop has previously been successfully grown. The soil should be broadcasted at the rate of 250 to 500 pounds per acre and harrowed in immediately. The spreading should take place on a cloudy day or in the evening, as the sun's rays are destructive to the germs. Care should be taken to avoid introducing noxious weeds and fungus diseases. Soil from the roots of sweet-clover plants also will inoculate alfalfa. Another method which may be used is that of inoculating the seed with an artificial culture, a limited quantity of which can be procured from the United States Department of Agriculture free of charge. Full instructions for use accompany each bottle of culture. The combined use of soil and artificial culture is recommended where both can be readily obtained.

#### SEEDING.

The seed should be sown without a nurse crop at the rate of 25 to 30 pounds per acre. In the Piedmont section good stands are secured

with a lighter seeding, but the heavier seedings have given the best results. In the coastal plain, where the soils are sandy and badly infested with crab-grass, less than 25 to 30 pounds of seed per acre is not advisable. The seed may be drilled or else broadcasted by hand or with a wheelbarrow seeder and covered lightly with a smoothing harrow or weeder. Drilling gives a higher percentage of germination, and as a result the rate of seeding under this practice may safely be somewhat less than when the seed is broadcasted. A much more uniform stand is secured by dividing the seed and sowing one-half each way of the field. The seeding may take place in the late summer or early fall or in the early spring. It is usually a simpler matter to get the ground in shape for spring seedings, and the moisture conditions are more favorable, but the weeds are apt to overwhelm the alfalfa before it gets a foothold, and for this reason spring seeding is seldom recommended. In the northern part of the region under consideration the middle of August has, on the average, given the best results. In the South Atlantic and Gulf States the date of seeding may with safety be delayed as late as the 15th of October. In these Southern States when weather conditions are especially favorable successful stands are sometimes secured when the seed is sown as late as the first of November, but as such late seedings are much more subject to winterkilling and produce lighter yields the first season, they are not recommended.

#### TREATMENT OF THE STAND.

The alfalfa should be cut when it is just coming into blossom, or, better, when the basal shoots appear, unless the weeds threaten to choke out the plants before this stage is reached, in which case earlier cutting is recommended. The early cuttings should not be mowed low, as the alfalfa plants will not start so quickly and are more likely to be crowded out by weeds. If the first cutting should be light, as is usually the case if the seed is sown in the spring, it may be left on the land as a mulch. If it is heavy enough to smother the alfalfa plants it should be removed. Whenever the plants turn yellow the crop should be cut and removed from the field, no matter what the stage of development. If the stand becomes thin or patchy, the field should be plowed and reseeded. Attempts at patching up poor stands have generally proved futile. In cases where the soil has become so compact from pasturing or where weeds are so numerous as to threaten considerable injury to the crop, cultivation in the spring or immediately after cutting, with a weeder in the sandy soils or with a spike-tooth harrow in the heavier soils, may be advisable. The alfalfa harrow, which is similar to the ordinary spring-tooth harrow with the ends of the teeth narrow and pointed, has generally

proved very satisfactory for the purpose. No implement which will mutilate the crowns and give an opportunity for the entrance of diseases should be used. A top-dressing of well-rotted, weed-free stable manure will benefit the crop. This should be applied in the fall or winter and should be evenly distributed, to avoid smothering the plants. If the stable manure is not available, a top-dressing of from 300 to 500 pounds of acid phosphate per acre, with a small amount of potash, may prove beneficial. Alfalfa makes good pasture for nearly all kinds of farm animals, but under no circumstances should it be pastured until it has become thoroughly established or when the ground is wet or frozen. It should not be pastured closely at any time, for the grazing down of the crowns will often result in destruction. Owing to the difficulty of procuring a good stand in the East, it is very doubtful whether a farmer should take the chance of injuring a well-established stand by pasturing it at all. Profitable results have been obtained, however, by removing the first two crops for hay and then pasturing with hogs for the remainder of the season. In the fall the hogs should be removed in time to allow a 6-inch to 8-inch growth for the protection of the plants during the winter months.

For more complete information, see Farmers' Bulletin 339, entitled "Alfalfa."

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